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OBSERVATIONS OF THE SUN, MOON, AND PLANETS SIX–INCH TRANSIT CIRCLE RESULTS

by

A. N. Adams and D. K. Scott

This *Circular* contains positions of the sun, moon, and planets observed with the Six–Inch Transit Circle from the beginning of the current observing program, 8 March, 1963 until 2 July, 1964. These results are provisional. Definitive results will be published later in a volume of *Publications of the U. S. Naval Observatory.*

These results are a continuation of those published in *U. S. Naval Observatory Circular* No. 103. The instrument was out of service from September 1962 to March 1963.

The observed positions are geocentric and have received the usual corrections for instrumental errors, refraction, diurnal aberration, parallax, and orbital motion. The right ascensions were reduced, differentially, to the FK4 system by means of the FK4 stars used to determine the clock correction.

The declinations of the night objects have been reduced to the FK4 system by applying a correction derived from the same stars that were used for the clock correction.

The sun, Mercury, and Venus were reduced with the clock correction of the nearest night tour and the nadirs taken at the time of the observation. Corrections for day minus night differences are not available at this time.

Observations of Mercury and Venus were made on the illuminated limb or on the center of light as indicated, and reduced with the appropriate corrections to the center of the planet. Observations of the sun, Mars, Jupiter, and Saturn were made on both pairs of limbs; those of Mars and Jupiter have been corrected for defective illumination. The tabular semidiameters from the ephemeris have been used whenever a correction from limb to center or a correction for defective illumination has been applied. The moon observations were made on the illuminated limbs as

indicated and have been reduced with the tabular values of the semidiameter corrected for irradiation (*Pub. U. S. Naval Observatory*, XVI, 378) and with limb corrections from the charts of C. B. Watts (*Astro. Papers, Vol.* 17).

The computed positions with which the observed positions are compared were derived from the tabular values of the *American Ephemeris* for the instant when the ephemeris hour angle is zero on the meridian $5^h 8^m 15.^s 849$ west longitude. No correction has been made for the difference between Ephemeris and Universal Time. The Julian Ephemeris Dates refer to the computed times of transit. The distances, in astronomical units, are those interpolated from the *American Ephemeris* at the computed time of transit. Brown's lunation numbers have been indicated for the moon.

The observers are identified as follows:

1, F. S. Gauss; 2, W. T. Toland; 3, S. M. Bestul; 4, B. L. Klock; 5, A. N. Adams;

6, D. K. Scott; 7, M. S. Kalish; 8, R. W. Rhynsburger; 9, G. E. Pease.

The values of ΔT from the moon observations (lunation means) are listed in Table I. The mean value of ΔT for 1963 is $32.^s 80$ ($\pm 0.^s 07$).

ΔT is computed by dividing (O–C) by 1.002738 times the variation per hour of longitude. The weights in right ascension are proportional to the square of 15 cos δ times the variation in right ascension per hour of longitude; those in declination are proportional to the square of the variation in declination per hour of longitude.

In order to convert from the equinox of FK4 to that of Newcomb, it is necessary to add $+1.^s 34$ to the values of ΔT tabulated in this circular.

TABLE I

Lun.	ΔT	P.E.	Lun.	ΔT	P.E.
	s	s		s	s
497	32.46	0.34	506	32.80	0.21
498	33.03	0.16	507	33.00	0.33
500	32.34	0.23	508	33.33	0.19
501	32.43	0.27	509	33.49	0.17
502	32.37	0.28	510	34.06	0.19
503	32.96	0.23	511	33.71	0.27
504	32.87	0.17	512	33.57	0.22
505	33.33	0.24	513	33.62	0.36

SUN

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
63 03 08.72	8097.22167	9		23 13 42.720	+.042		- 4 58 15.11	+1.86	0.992665
63 03 15.72	8104.22038	9		23 39 26.829	+.012		- 2 13 24.67	+1.16	0.994552
63 03 18.71	8107.21979	8		23 50 24.788	+.007		- 1 02 20.27	-0.65	0.995397
63 03 25.71	8114.21834	9		0 15 55.340	+.030		+ 1 43 26.04	-0.32	0.997398
63 03 27.71	8116.21792	8		0 23 12.082	+.064		+ 2 30 32.23	-0.42	0.997965
63 03 28.71	8117.21771	4		0 26 50.411	+.051		+ 2 54		0.998247
63 03 29.71	8118.21750	9		0 30 28.786	+.061		+ 3 17 26.55	+0.21	0.998529
63 04 04.71	8124.21625	6		0 52 20.154	+.030		+ 5 36 23.36	-0.14	1.000220
63 04 06.71	8126.21585	6		0 59 38.238	+.027		+ 6 21 58.67	+0.23	1.000787
63 04 08.71	8128.21546	8		1 06 57.024	-.037		+ 7 07 07.68	+0.87	1.001358
63 04 10.71	8130.21507	6		1 14 16.922	+.083		+ 7 51 45.83	-0.32	1.001931
63 04 11.71	8131.21488	4		1 17 57.083	-.046		+ 8 13 53.22	-0.88	1.002219
63 04 12.71	8132.21470	9		1 21 37.740	+.023		+ 8 35 53.58	-0.28	1.002507
63 04 14.71	8134.21434	6		1 28 59.852	-.008		+ 9 19 27.10	-0.21	1.003083
63 04 15.71	8135.21417	4		1 32 41.492	+.053		+ 9 41		1.003370
63 04 16.71	8136.21400	8		1 36 23.392	.000		+10 02 24.19	+0.07	1.003657
63 04 20.71	8140.21337	6		1 51 15.244	+.091		+11 26 16.45	-0.38	1.004791
63 05 31.71	8181.21236	2		4 31 26.011	+.041		+21 52		1.013968
63 06 04.71	8185.21279	8		4 47			+22 24 23.58	-0.27	1.014542
63 06 05.71	8186.21290	7		4 51 56.205	-.006		+22 31 16.53	-0.06	1.014678
63 06 06.71	8187.21303	6		4 56 03.348	+.044		+22 37 44.66	-0.98	1.014810
63 06 07.71	8188.21315	9		5 00 10.694	-.012		+22 43 50.36	-0.64	1.014939
63 07 03.71	8214.21688	8		6 48			+22 58 57.99	-1.16	1.016714
63 07 04.71	8215.21701	1		6 52			+22 54 02.12	-0.69	1.016715
63 07 05.71	8216.21713	2		6 56 19.037	+.010		+22 48 42.46	-0.05	1.016713
63 07 06.71	8217.21725	6		7 00			+22 42 57.79	-0.67	1.016707
63 07 08.71	8219.21747	7		7 08 38.449	+.049		+22 30		1.016685
63 07 09.71	8220.21758	4		7 12 44.085	-.015		+22 23 24.70	-0.44	1.016669
63 07 11.71	8222.21778	1		7 20 54.269	-.031		+22 08 25.53	-1.31	1.016625
63 07 12.71	8223.21787	6		7 24 58.798	+.034		+22 00 22.41	-0.97	1.016598
63 07 23.71	8234.21850	1		8 09 15.953	-.018		+20 07 34.20	-0.31	1.015948
63 07 30.71	8241.21849	7		8 36			+18 34 16.64	-0.67	1.015183
63 08 01.71	8243.21843	1		8 44 38.274	-.053		+18 04		1.014926
63 08 02.71	8244.21838	4		8 48 31.064	+.021		+17 49 39.04	-0.30	1.014792
63 08 04.71	8246.21827	7		8 56 14.703	+.062		+17 18 26.31	-0.45	1.014515
63 08 05.71	8247.21821	1		9 00 05.587	+.063		+17 02 23.16	-1.93	1.014373
63 08 06.71	8248.21813	7		9 03 55.858	+.053		+16 46 05.21	-1.74	1.014227
63 08 15.71	8257.21719	2		9 38 02.851	+.063		+14 07		1.012774
63 08 16.71	8258.21705	9		9 41 47.482	-.059		+13 48 59.66	-1.22	1.012592
63 08 18.71	8260.21676	7		9 49 15.542	+.028		+13 10 44.91	-2.21	1.012214
63 08 22.71	8264.21611	8		10 04 05.519	+.049		+11 51 51.93	+0.30	1.011399
63 08 25.71	8267.21557	7		10 15 07.983	-.026		+10 50 38.35	-2.48	1.010742
63 08 26.71	8268.21538	8		10 18 47.958	-.027		+10 29 55.79	-0.52	1.010515
63 09 27.70	8300.20791	2		12 14 10.741	+.031		- 1 32		1.002192
63 09 30.70	8303.20721	1		12 25 00.043	+.063		- 2 42		1.001320
63 10 01.70	8304.20698	4		12 28 36.996	+.116		- 3 05		1.001031
63 10 02.70	8305.20676	1		12 32 14.133	+.084		- 3 28		1.000742
63 10 04.70	8307.20632	9		12 39 29.372	+.043		- 4 15 09.38	-1.58	1.000169
63 10 05.70	8308.20611	6		12 43			- 4 38 16.66	-1.23	0.999884
63 10 09.70	8312.20531	2		12 57 44.138	-.007		- 6 10 09.62	-0.57	0.998757
63 10 10.70	8313.20512	8		13 01 24.494	+.079		- 6 32 56.87	-0.33	0.998477
63 10 11.70	8314.20494	9		13 05			- 6 55 39.41	-0.44	0.998196
63 10 15.70	8318.20427	6		13 19 53.449	+.155		- 8 25 29.93	-0.18	0.997072
63 10 16.70	8319.20412	4		13 23 36.749	+.064		- 8 47 40.88	-0.06	0.996790
63 10 18.70	8321.20383	9		13 31 05.296	+.077		- 9 31 40.04	+0.18	0.996226

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Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
63 10 21.70	8324.20346	8		13 42 22.709	+.113		-10 36 36.95	-0.57	0.995379
63 10 24.70	8327.20315	2		13 53 45.885	+.090		-11 40 07.77	-0.34	0.994536
63 10 25.70	8328.20307	1		13 57 34.968	+.089		-12 00 57.43	-0.53	0.994257
63 10 30.70	8333.20276	6		14 16 51.142	+.119		-13 42 09.34	+0.29	0.992895
63 11 18.70	8352.20374	8		15 33 10.177	+.116		-19 10 08.88	+1.56	0.988425
63 11 19.70	8353.20389	9		15 37 19.684	+.128		-19 24 24.37	-0.21	0.988214
63 11 20.70	8354.20404	8		15 41 29.982	+.106		-19 38 15.53	+1.35	0.988005
63 12 04.70	8368.20717	4		16 41 12.805	+.097		-22 12 29.53	+0.31	0.985512
63 12 07.70	8371.20804	6		16 54 17.398	+.115		-22 35 00.53	+1.52	0.985112
63 12 15.71	8379.21059	6		17 29 30.638	+.187		-23 15		0.984231
63 12 22.71	8386.21298	6		18 00 34.151	+.110		-23 26 35.71	+0.37	0.983658
64 01 02.71	8397.21671	1		18 49			-22 57 31.36	+0.95	0.983263
64 01 03.71	8398.21704	7		18 53 43.973	+.046		-22 52		0.983265
64 01 04.71	8399.21735	6		18 58 08.216	+.088		-22 46 12.95	+1.07	0.983274
64 01 07.71	8402.21828	7		19 11 18.418	+.067		-22 25 53.02	+0.41	0.983330
64 01 18.72	8413.22122	6		19 58 54.918	+.104		-20 38 03.17	+1.95	0.983875
64 01 28.72	8423.22303	6		20 40 56.962	+.140		-18 18		0.984822
64 01 29.72	8424.22316	7		20 45 04.623	+.032		-18 03 07.95	+0.46	0.984948
64 01 30.72	8425.22328	2		20 49 11.631	+.087		-17 46 58.64	+0.68	0.985080
64 02 03.72	8429.22366	2		21 05 31.401	+.142		-16 39		0.985663
64 02 04.72	8430.22374	6		21 09 34.334	+.158		-16 21 35.81	+0.62	0.985821
64 02 05.72	8431.22380	2		21 13 36.448	+.140		-16 03 38.52	+0.57	0.985984
64 02 17.72	8443.22387	2		22 01 01.244	+.088		-12 08		0.988198
64 02 20.72	8446.22370	4		22 12 35.673	+.089		-11 04 55.69	+0.39	0.988811
64 02 22.72	8448.22354	6		22 20 15.195	+.101		-10 21 38.16	+1.95	0.989237
64 02 26.72	8452.22314	1		22 35 26.463	+.032		- 8 53		0.990135
64 02 27.72	8453.22302	7		22 39 12.815	+.037		- 8 30		0.990371
64 03 02.72	8457.22249	8		22 54 12.827	-.011		- 6 59 56.40	+0.65	0.991354
64 03 10.72	8465.22118	7		23 23 51.878	+.043		- 3 53 42.94	+0.40	0.993460
64 03 11.72	8466.22099	6		23 27 32.683	+.084		- 3 30 08.69	+0.72	0.993730
64 03 13.72	8468.22062	1		23 34 53.228	-.032		- 2 42 53.80	+0.63	0.994273
64 03 16.72	8471.22004	8		23 45 52.359	+.058		- 1 31 49.56	+0.12	0.995089
64 03 23.71	8478.21860	8		0 11 23.512	+.043		+ 1 14 03.70	+0.03	0.997009
64 03 24.71	8479.21838	7		0 15 01.826	+.093		+ 1 37 41.04	+0.75	0.997288
64 03 26.71	8481.21796	1		0 22 18.133	+.008		+ 2 24 45.41	-0.54	0.997852
64 03 27.71	8482.21775	2		0 25 56.331	+.027		+ 2 48 15.45	+1.06	0.998136
64 04 05.71	8491.21588	7		0 58 43.621	+.097		+ 6 16 19.33	+0.51	1.000758
64 04 16.71	8502.21387	4		1 39 11.581	+.059		+10 18 29.11	-0.58	1.003893
64 04 23.71	8509.21284	4		2 05 18.312	-.014		+12 42 19.55	-0.43	1.005768
64 04 26.71	8512.21248	7		2 16 36.391	+.024		+13 40 55.82	-0.13	1.006559
64 05 04.71	8520.21177	9		2 47 07.364	-.017		+16 06 55.92	+0.13	1.008623
64 05 05.71	8521.21171	2		2 50 58.802	+.029		+16 24 02.36	+0.10	1.008872
64 05 06.71	8522.21166	4		2 54 50.800	+.057		+16 40 53.00	+0.46	1.009120
64 05 07.71	8523.21161	8		2 58 43.307	+.012		+16 57 26.77	+0.52	1.009364
64 05 08.71	8524.21157	9		3 02 36.382	-.046		+17 13 42.72	-0.32	1.009603
64 05 11.71	8527.21149	8		3 14 19.345	-.018		+18 00 48.65	-0.52	1.010299
64 05 16.71	8532.21150	6		3 34 02.529	+.129		+19 13 12.86	-0.22	1.011369
64 05 18.71	8534.21154	1		3 41 59.465	+.012		+19 39		1.011768
64 05 19.71	8535.21157	9		3 45 58.838	+.060		+19 52 46.17	-0.33	1.011962
64 05 20.71	8536.21161	2		3 49 58.605	-.023		+20 05		1.012153
64 05 21.71	8537.21166	4		3 53 59.078	+.080		+20 17 27.57	+0.48	1.012340
64 05 23.71	8539.21176	6		4 02			+20 40 44.00	-0.07	1.012708
64 05 25.71	8541.21189	9		4 10 05.667	+.071		+21 02 35.17	-0.51	1.013066
64 05 26.71	8542.21197	6		4 14 08.601	+.107		+21 12 59.19	+0.22	1.013240
64 05 27.71	8543.21204	9		4 18 11.941	+.073		+21 23		1.013413

SUN

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
64 05 30.71	8546.21231	6		4 30 24.865	+.082		+21 50 49.34	-1.29	1.013912
64 06 04.71	8551.21286	2		4 50 54.835	+.034		+22 29		1.014678
64 06 05.71	8552.21298	9		4 55 02.034	+.092		+22 36 12.62	-0.40	1.014819
64 06 11.71	8558.21379	2		5 19 51.196	+.048		+23 07 21.07	-1.06	1.015549
64 06 15.71	8562.21437	1		5 36 27.909	-.121		+23 19 59.85	-0.99	1.015918
64 06 16.71	8563.21452	9		5 40 37.549	+.040		+23 22		1.015997
64 06 17.71	8564.21467	6		5 44 47.083	+.031		+23 23 51.87	-0.04	1.016072
64 06 20.71	8567.21512	6		5 57 15.956	+.154		+23 26 31.71	-0.60	1.016271
64 06 25.71	8572.21586	8		6 18 02.954	+.038		+23 22 42.75	-0.80	1.016526
64 06 26.71	8573.21601	2		6 22 12.011	-.012		+23 20 42.15	-1.48	1.016566
64 06 27.71	8574.21615	6		6 26 21.032	+.048		+23 18 18.87	-0.29	1.016603
64 06 30.71	8577.21657	6		6 38 46.733	-.017		+23 08 38.92	-0.13	1.016692
64 07 02.71	8579.21683	2		6 47 02.866	+.046		+23 00 09.34	-1.42	1.016729

MERCURY

63 03 18.69	8107.19320	8	C	23 12 01.160	+.090	C	- 7 29 21.97	+0.58	1.336637
63 04 06.73	8126.23483	6		1 27		C	+ 9 06 59.62	+1.50	1.280109
63 04 10.74	8130.24459	6	C	1 56 54.107	+.058	C	+12 44 10.95	+1.01	1.215155
63 04 12.74	8132.24922	9	C	2 11 28.275	+.071	C	+14 25 02.20	-0.33	1.175286
63 04 14.75	8134.25353	6	C	2 25 34.730	+.089	C	+15 58 36.15	+0.85	1.131417
63 04 15.75	8135.25552	4	C	2 32 24.314	+.065		+16 42		1.108282
63 04 16.75	8136.25740	8	C	2 39 03.130	+.021	C	+17 23 29.27	+0.21	1.084522
63 04 20.76	8140.26339	6	C	3 03 28.451	-.013	C	+19 43 52.05	+0.59	0.985937
63 07 05.68	8216.18782	2	C	6 14 00.058	+.099	C	+23 45 12.08	+0.54	1.260041
63 07 06.69	8217.19145	6	C	6 23 10.804	+.099	C	+23 51 35.60	-0.53	1.273725
63 08 05.77	8247.27629	1	C	10 23 57.920	+.093	C	+10 46 50.83	-1.90	1.175863
63 08 25.78	8267.28324	7	C	11 52 50.636	-.074	C	- 1 48 02.83	-0.18	0.901749
63 09 30.66	8303.16650	1	C	11 26 12.889	+.148		+ 3 55		0.819526
63 10 04.66	8307.16217	9	C	11 35 43.952	+.013	C	+ 3 54 39.68	-0.05	0.928742
63 10 05.66	8308.16195	6	C	11 39 21.491	+.013	C	+ 3 42 35.30	+0.72	0.957093
63 10 07.66	8310.16234	9	C	11 47 48.820	+.151	C	+ 3 05 57.31	-1.81	1.013453
63 10 09.66	8312.16364	2	C	11 57 34.228	+.055	C	+ 2 15 02.77	-1.58	1.068093
63 10 10.66	8313.16456	8	C	12 02 50.103	+.147	C	+ 1 45 06.26	-1.11	1.094383
63 10 11.66	8314.16561	9		12 08		C	+ 1 12 37.20	-1.34	1.119826
63 10 15.67	8318.17083	6	C	12 31 36.037	+.067	C	- 1 16 14.74	-0.54	1.211702
63 10 16.67	8319.17229	4	C	12 37 39.581	+.127	C	- 1 56 48.19	-0.87	1.232002
63 10 30.69	8333.19435	6	C	14 04 42.673	+.135	C	-11 46 47.77	+0.26	1.411197
63 11 16.72	8350.22225	6	C	15 52 00.771	-.103		-21 15		1.433204
63 12 07.76	8371.26041	6		18 09		C	-25 46 08.65	+2.89	1.225517
63 12 15.77	8379.27150	6	C	18 57 28.218	+.046		-24 49		1.067612
63 12 16.77	8380.27231	2	C	19 02 34.979	+.082		-24 36		1.044643
63 12 22.77	8386.27185	6	C	19 25 34.335	+.047	C	-23 00 00.64	+0.55	0.896629
64 01 28.65	8423.15075	6	C	18 56 34.932	+.190	C	-21 58 13.30	-1.53	1.032141
64 02 03.65	8429.15580	2	C	19 27 31.928	+.126	C	-22 00 27.67	+1.71	1.126228
64 02 04.65	8430.15693	6	C	19 33 06.411	+.083	C	-21 57 02.27	+0.52	1.140436
64 02 17.67	8443.17588	2	C	20 51 43.527	+.212	C	-19 19 51.16	-1.22	1.287536
64 03 06.70	8461.20876	2	C	22 50 10.422	+.160	C	- 9 35 58.02	+2.38	1.372750
64 03 16.72	8471.22972	8	C	23 59 51.678	+.157	C	- 1 15 13.82	+0.90	1.331980
64 03 23.74	8478.24503	8	C	0 49 33.355	+.044	C	+ 5 19 32.76	+0.71	1.238805
64 03 26.75	8481.25113	1	C	1 10 11.634	+.035		+ 8 05		1.179715
64 03 27.75	8482.25301	2	C	1 16 51.273	+.098	C	+ 8 58 45.42	+1.63	1.157699
64 05 21.64	8537.14607	4	C	2 19 16.401	+.046	C	+10 12 21.34	+0.31	0.766775
64 05 25.64	8541.14459	9	C	2 32 55.069	+.099	C	+11 22 29.52	+0.13	0.832928
64 05 30.64	8546.14592	6	C	2 54 32.664	+.042	C	+13 21 59.06	+0.52	0.922028
64 06 04.65	8551.15069	2	C	3 21 08.747	+.078	C	+15 45 59.21	+0.18	1.015824

MERCURY

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
64 06 11.66	8558.16345	2	C	4 07 10.056	+.088	C	+19 24 08.04	+0.55	1.147194
64 06 17.68	8564.18037	6	C	4 55 15.705	+.108	C	+22 14 19.53	−0.04	1.245706
64 06 30.72	8577.22952	6	C	6 57 29.224	+.117	C	+24 22 03.95	+0.18	1.323878
64 07 02.73	8579.23696	2	C	7 16 06.611	+.106	C	+24 01 25.96	−1.07	1.315776

VENUS

63 03 14.61	8103.11029	6	2	20 56 32.005	+.132	N	−16 52 10.15	−0.78	1.047938
63 03 15.61	8104.11087	9	2	21 01 19.016	+.238	N	−16 36 15.34	+2.25	1.055015
63 03 18.61	8107.11257	8	2	21 15 36.361	+.215	N	−15 45 52.99	−0.14	1.076123
63 03 28.61	8117.11778	4	2	22 02 33.071	+.243		−12 29		1.145025
63 04 04.62	8124.12097	6	2	22 34 44.990	+.143	N	− 9 50 44.60	+1.11	1.191867
63 04 06.62	8126.12182	6	2	22 43 51.395	+.112	N	− 9 02 33.44	+0.74	1.205037
63 04 10.62	8130.12343	6	2	23 01 57.803	+.115	N	− 7 23 02.84	+1.31	1.231083
63 04 12.62	8132.12421	9	2	23 10 58.175	+.141	N	− 6 31 54.62	+1.03	1.243951
63 04 14.62	8134.12497	6	2	23 19 56.811	+.091	N	− 5 39 57.20	+1.07	1.256711
63 04 16.62	8136.12571	8	2	23 28 54.136	+.179	N	− 4 47 15.74	+1.30	1.269359
63 04 20.62	8140.12715	6	2	23 46 45.103	+.180	N	− 3 00 03.06	+1.43	1.294300
63 05 31.64	8181.14407	2	2	2 52 50.156	+.101	N	+14 59 05.81	−0.49	1.518478
63 06 04.64	8185.14647	8		3 12		N	+16 25 46.02	+0.18	1.536773
63 06 06.64	8187.14774	6	2	3 21 47.125	+.115	N	+17 06 44.64	−0.72	1.545655
63 07 05.67	8216.17151	2	2	5 50 26.430	+.081	N	+23 09 52.30	−0.28	1.652345
63 07 06.67	8217.17246	6		5 55		N	+23 13 13.70	−1.11	1.655242
63 07 11.67	8222.17725	1	2	6 22 23.800	+.090	S	+23 19 54.96	−0.50	1.668916
63 07 12.67	8223.17822	6	2	6 27 43.996	+.170		+23 19		1.671487
63 07 26.69	8237.19146	6	2	7 42 02.532	+.069	S	+21 57 42.30	−1.13	1.701480
63 08 04.69	8246.19923	7	2	8 28 45.231	+.050	S	+19 58 07.68	−0.62	1.714824
63 08 05.70	8247.20004	1	2	8 33 52.177	+.141		+19 41		1.716026
63 08 15.70	8257.20751	2	2	9 24 04.145	−.060	S	+16 29 42.90	−0.45	1.724964
63 09 27.72	8300.22891	2	1	12 44 30.735	+.116		− 3 31		1.701620
63 09 30.73	8303.23022	1	1	12 58 12.822	−.093		− 5 02		1.696550
63 10 01.73	8304.23066	4	1	13 02 47.878	+.110		− 5 32		1.694771
63 10 02.73	8305.23110	1	1	13 07 23.164	+.083		− 6 02		1.692948
63 10 04.73	8307.23202	9	1	13 16 35.181	−.051	N	− 7 01 53.84	−0.08	1.689174
63 10 05.73	8308.23248	6	1	13 21 12.188	+.021	N	− 7 31 31.28	−0.60	1.687223
63 10 06.73	8309.23296	2	1	13 25 49.713	−.013	N	− 8 00 58.49	−0.57	1.685229
63 10 07.73	8310.23344	9	1	13 30 28.031	+.077	N	− 8 30 16.19	−1.27	1.683194
63 10 09.73	8312.23442	2	1	13 39 46.568	−.021	N	− 9 28 15.39	−0.56	1.678995
63 10 10.73	8313.23493	8	1	13 44 27.083	+.022	N	− 9 56 55.14	+1.12	1.676832
63 10 11.73	8314.23545	9		13 49		N	−10 25 24.30	−0.14	1.674627
63 10 15.73	8318.23762	6	1	14 08 02.503	+.135	N	−12 16 46.70	−0.87	1.665384
63 10 16.73	8319.23819	4	1	14 12 48.344	+.093	N	−12 43 55.30	−0.54	1.662967
63 10 18.73	8321.23936	9	1	14 22 23.048	−.027	N	−13 37 17.14	−0.03	1.658009
63 10 21.74	8324.24121	8	1	14 36 53.344	−.005	N	−14 54 50.77	−0.81	1.650262
63 10 25.74	8328.24387	1	1	14 56 29.640	+.018	N	−16 32 59.35	−0.61	1.639368
63 10 30.74	8333.24750	6	1	15 21 26.946	+.089	N	−18 26 01.36	−0.97	1.624880
63 11 16.76	8350.26245	6	1	16 50 03.414	+.146	N	−23 09 32.41	+0.73	1.568929
63 11 19.76	8353.26545	9	1	17 06 12.978	−.022	N	−23 40 34.22	+0.75	1.557992
63 12 04.78	8368.28123	4	1	18 28 08.969	+.045	N	−24 37 31.16	+0.84	1.498747
63 12 07.78	8371.28441	6	1	18 44 33.628	+.109	S	−24 28 37.45	+2.64	1.486040
63 12 15.79	8379.29261	6	1	19 27 56.642	+.094		−23 32		1.450757
63 12 16.79	8380.29359	2	1	19 33 18.647	+.130		−23 22		1.446201
63 12 22.79	8386.29926	6	1	20 05 08.714	+.109	S	−22 05 54.29	+1.67	1.418174
64 01 02.80	8397.30828	1	1	21 01		S	−18 47 35.34	+1.03	1.363814
64 01 03.80	8398.30901	7	1	21 06 31.961	+.086	S	−18 26		1.358690
64 01 04.80	8399.30971	6	1	21 11 29.746	+.021	S	−18 04 18.01	+1.09	1.353536
64 01 07.81	8402.31174	7	1	21 26 14.853	+.121	S	−16 55 41.52	+1.07	1.337887

VENUS

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
64 01 18.81	8413.31794	6	1	22 18 34.086	+.061	S	-12 11 42.50	+1.42	1.278065
64 01 28.82	8423.32208	6	1	23 03 58.734	+.063	S	- 7 20 30.91	+2.79	1.220246
64 01 29.82	8424.32243	7	1	23 08 25.452	+.026	S	- 6 50 13.92	+0.98	1.214290
64 01 30.82	8425.32277	2	1	23 12 51.315	+.051	S	- 6 19 43.86	+2.40	1.208303
64 02 03.82	8429.32403	2	1	23 30 26.326	-.022	S	- 4 16 25.41	+0.90	1.184048
64 02 04.82	8430.32432	6	1	23 34 48.257	+.020	S	- 3 45 18.13	+0.57	1.177907
64 02 05.82	8431.32460	2	1	23 39 09.507	+.061	S	- 3 14 04.93	+0.55	1.171735
64 02 22.82	8448.32863	6	1	0 51 59.854	+.061	S	+ 5 39 18.10	+0.83	1.061890
64 02 24.82	8450.32905	8	1	1 00 29.166	+.019	S	+ 6 40 51.29	+0.49	1.048354
64 02 27.82	8453.32967	7	1	1 13 12.854	+.088		+ 8 12		1.027825
64 03 06.83	8461.33136	2	1	1 47 11.757	+.072	S	+12 06 37.29	+0.35	0.971814
64 03 11.83	8466.33248	6	1	2 08 31.283	-.013	S	+14 24 56.55	+0.50	0.935903
64 03 13.83	8468.33294	1	1	2 17 04.626	-.017	S	+15 18 07.07	+0.67	0.921346
64 03 16.83	8471.33366	8	1	2 29 56.117	-.148	S	+16 35 15.86	-1.92	0.899306
64 03 23.83	8478.33539	8	1	3 00 02.338	-.043	S	+19 21 59.16	-0.36	0.846974
64 03 27.83	8482.33640	2	1	3 17 15.474	+.002	S	+20 47 50.14	+0.43	0.816569
64 04 04.83	8490.33830	6	1	3 51 32.780	-.023	S	+23 16 31.54	+0.74	0.754912
64 04 05.83	8491.33852	7	1	3 55 48.129	-.014	S	+23 32 50.46	+1.10	0.747139
64 04 16.84	8502.34021	4	1	4 41 36.932	-.080	S	+25 56 53.32	-1.71	0.661015
64 04 17.84	8503.34027	2	1	4 45 38.836	.000	S	+26 06 45.23	+0.29	0.653150
64 04 23.84	8509.34013	4	1	5 09 05.385	-.195	S	+26 54 17.47	+0.58	0.605999
64 05 04.83	8520.33660	9	1	5 47 22.004	-.070	S	+27 32 22.37	-1.10	0.520852
64 05 06.83	8522.33534	4	1	5 53 25.878	-.292	S	+27 32 58.20	-2.09	0.505737
64 05 16.82	8532.32509	6	1	6 18 03.803	-.084	S	+27 10 46.37	+1.24	0.433146
64 05 19.82	8535.32045	9	1	6 23 11.020	-.143	S	+26 56 39.83	-1.77	0.412714
64 05 20.81	8536.31871	2	1	6 24 36.984	-.114	S	+26 51 18.47	-0.58	0.406088
64 05 21.81	8537.31687	4	1	6 25 54.137	-.221	S	+26 45 35.47	-1.03	0.399564
64 05 22.81	8538.31493	2	1	6 27 02.541	-.125	S	+26 39 31.98	-2.17	0.393150
64 05 23.81	8539.31288	6	1	6 28 01.767	-.021	S	+26 33 14.17	+1.98	0.386851
64 05 25.80	8541.30846	9	1	6 29 31.262	-.217	S	+26 19 28.84	-1.40	0.374628
64 05 26.80	8542.30607	6	1	6 30 01.464	-.167	S	+26 12 11.94	+1.52	0.368720
64 05 30.79	8546.29536	6	1	6 30 19.809	-.215	S	+25 39 40.23	+1.40	0.346617
64 06 05.77	8552.27567	9	1	6 25 32.595	-.294	S	+24 40 56.94	-0.44	0.318981
64 06 11.75	8558.25190	2	1	6 14 53.365	-.254	N	+23 30 00.05	-1.10	0.299619
64 06 16.72	8563.22983	9	1	6 02 43.723	-.437	N	+22 22 46.47	-1.84	0.291030
64 06 17.72	8564.22528	6	1	6 00 05.758	-.330	N	+22 08 45.66	-1.42	0.290209
64 06 25.68	8572.18907	8	2	5 39 21.327	-.214	N	+20 17 53.51	-0.53	0.294739
64 06 26.68	8573.18474	2	2	5 37 02.747	-.252	N	+20 05 04.94	-0.28	0.296664
64 06 27.68	8574.18049	6	2	5 34 50.959	-.110	N	+19 52 41.67	-0.42	0.298875
64 06 30.66	8577.16826	6	2	5 29 01.124	-.083	N	+19 18 34.90	-0.62	0.307154

MARS

63 03 08.11	8096.61438	3		8 36 48.837	-.120		+22 34 42.36	+1.13	0.784054
63 03 09.11	8097.61133	9		8 36 20.717	-.135		+22 34 09.17	+0.24	0.790422
63 03 10.10	8098.60831	6		8 35 55.887	-.087		+22 33 23.90	+0.32	0.796915
63 03 11.10	8099.60533	7		8 35			+22 32 26.49	+0.70	0.803528
63 03 14.09	8102.59661	7		8 34 48.425	-.090		+22 28 20.38	+1.19	0.824061
63 03 15.09	8103.59378	6		8 34 39.455	-.083		+22 26 33.63	-0.06	0.831123
63 03 16.09	8104.59098	9		8 34 33.572	-.089		+22 24 37.59	+0.71	0.838288
63 03 18.08	8106.58549	8		8 34 31.008	-.079		+22 20 11.09	+0.69	0.852914
63 03 19.08	8107.58279	8		8 34 34.239	-.072		+22 17 41.72	+0.50	0.860368
63 03 23.07	8111.57236	9		8 35 16.319	-.112		+22 06		0.891050

MARS

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
63 03 24.06	8112.56983	6		8 35 33.970	-.084		+22 02 44.86	+0.80	0.898919
63 03 28.06	8116.56004	7		8 37 11.615	-.077		+21 47 56.17	+1.01	0.931098
63 03 29.05	8117.55766	4		8 37 42.596	-.053		+21 43		0.939300
63 03 30.05	8118.55532	9		8 38 16.014	-.107		+21 39 37.92	+0.79	0.947557
63 04 01.05	8120.55072	7		8 39 30.303	-.083		+21 30 44.66	-0.10	0.964230
63 04 03.04	8122.54622	2		8 40 53.994	-.026		+21 21 19.93	+0.49	0.981093
63 04 04.04	8123.54401	7		8 41 39.122	-.088		+21 16		0.989589
63 04 05.04	8124.54183	6		8 42 26.531	-.037		+21 11 22.89	+1.04	0.998124
63 04 06.03	8125.53967	4		8 43 15.989	-.058		+21 06 11.32	+0.02	1.006698
63 04 08.03	8127.53542	7		8 45 01.081	-.074		+20 55 26.79	0.00	1.023948
63 04 10.03	8129.53126	2		8 46 54.080	-.059		+20 44 12.34	+0.45	1.041325

JUPITER

63 08 24.34	8265.84279	9		1 12 55.514	+.012		+ 6 04 22.81	+0.69	4.225571
63 08 28.33	8269.83133	9		1 12 08.272	-.003		+ 5 58 32.20	+0.42	4.181478
63 09 07.30	8279.80212	9		1 09 23.563	+.004		+ 5 39 25.59	+0.37	4.085690
63 09 08.29	8280.79916	6		1 09 03.596	-.064		+ 5 37		4.077348
63 10 01.22	8303.72959	8		0 59 16.712	-.028		+ 4 33		3.958423
63 10 02.22	8304.72652	9		0 58 47.413	-.042		+ 4 30		3.956680
63 10 04.22	8306.72038	2		0 57 48.455	-.021		+ 4 24 30.73	+0.36	3.954091
63 10 05.21	8307.71730	4		0 57 18.823	-.005		+ 4 21 24.65	+0.21	3.953247
63 10 06.21	8308.71423	6		0 56 49.066	-.038		+ 4 18 19.02	+0.62	3.952704
63 10 07.21	8309.71116	2		0 56			+ 4 15 12.71	+0.31	3.952462
63 10 08.20	8310.70808	9		0 55 49.478	-.031		+ 4 12 07.07	+0.51	3.952524
63 10 11.19	8313.69886	8		0 54 20.077	+.005		+ 4 02 51.91	+0.55	3.954531
63 10 12.19	8314.69578	9		0 53 50.310	-.023		+ 3 59 48.67	+1.15	3.955809
63 10 13.19	8315.69271	6		0 53 20.703	+.033		+ 3 56 45.14	+0.62	3.957393
63 10 14.18	8316.68964	2		0 52 51.093	-.014		+ 3 53 42.81	+0.27	3.959279
63 10 15.18	8317.68657	8		0 52 21.658	-.009		+ 3 50 42.54	+0.85	3.961471
63 10 16.18	8318.68350	6		0 51 52.331	-.045		+ 3 47 42.69	+0.54	3.963966
63 10 19.17	8321.67431	2		0 50 25.635	+.001		+ 3 38 52.96	+0.13	3.973263
63 10 21.16	8323.66819	6		0 49 28.936	-.046		+ 3 33 09.38	+0.18	3.980958
63 10 24.15	8326.65905	1		0 48			+ 3 24 49.51	-0.91	3.994711
63 10 25.15	8327.65601	8		0 47 39.255	-.030		+ 3 22 09.56	+0.45	3.999876
63 10 27.14	8329.64994	6		0 46 46.523	-.036		+ 3 16 54.47	-0.19	4.011066
63 10 28.14	8330.64691	2		0 46 20.820	+.028		+ 3 16 03.64	+1.91	4.017083
63 11 10.10	8343.60806	6		0 41 30.208	+.018		+ 2 46 25.23	+0.48	4.119637
63 11 15.09	8348.59342	8		0 40 04.469	-.024		+ 2 38 38.12	-0.12	4.170237
63 11 16.09	8349.59051	2		0 39 49.280	-.065		+ 2 37 18.79	+0.47	4.181033

SATURN

63 07 09.32	8219.82056	7		21 39 27.913	+.043		-15 14		9.043255
63 07 12.31	8222.81193	1		21 38 50.061	+.012		-15 18 08.43	-0.01	9.015129
63 07 25.27	8235.77426	7		21 35 41.116	+.018		-15 35 33.84	+0.76	8.919691
63 07 26.27	8236.77134	8		21 35 25.178	+.029		-15 36 59.61	+1.04	8.914242
63 07 27.26	8237.76843	6		21 35 09.059	+.021		-15 38 26.70	+0.57	8.909074
63 08 02.25	8243.75089	1		21 33 29.451	-.024		-15 47 14.17	+2.13	8.884053
63 08 05.24	8246.74211	7		21 32 38.230	+.035		-15 51 44.09	+0.92	8.875444
63 08 06.23	8247.73918	1		21 32			-15 53 13.61	+1.32	8.873159
63 08 08.23	8249.73332	1		21 31 46.200	+.017		-15 56 14.59	+0.46	8.869470
63 08 09.23	8250.73039	4		21 31 28.718	-.004		-15 57 44.64	+0.49	8.868068

SATURN

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
63 08 15.21	8256.71279	1		21 29 43.333	+.021		-16 06 42.70	+0.36	8.865901
63 08 17.20	8258.70692	9		21 29 08.135	-.017		-16 09 38.97	+1.43	8.867571
63 08 19.20	8260.70105	7		21 28 33.094	+.001		-16 12		8.870440
63 08 23.18	8264.68933	8		21 27 23.636	+.054		-16 18 22.22	-0.33	8.879756
63 08 24.18	8265.68640	9		21 27 06.359	-.031		-16 19 45.02	+1.72	8.882825
63 08 26.18	8267.68055	7		21 26 32.329	+.028		-16 22 33.25	+1.02	8.889845
63 08 28.17	8269.67470	9		21 25 58.671	+.005		-16 25 17.44	+1.20	8.898027
63 09 09.13	8281.63976	4		21 22 49.919	-.012		-16 40		8.970732
63 09 26.09	8298.59092	8		21 19 20.354	+.041		-16 56		9.137254
63 09 27.08	8299.58808	4		21 19 10.740	+.018		-16 57		9.149093
63 09 30.07	8302.57958	6		21 18 44.002	+.008		-16 59		9.185803

URANUS

63 03 08.18	8096.68563	3		10 19 41.537	-.070		+11 16 25.87	+0.12	17.350350
63 03 09.18	8097.68279	9		10 19 32.011	-.025		+11 17 19.57	+0.01	17.354392
63 03 10.17	8098.67995	6		10 19 22.482	-.042		+11 18 12.66	-0.30	17.358724
63 03 11.17	8099.67711	7		10 19 13.034	-.042		+11 19 05.78	-0.14	17.363353
63 03 14.16	8102.66860	7		10 18 45.149	-.011		+11 21 41.54	-0.31	17.378969
63 03 15.16	8103.66576	6		10 18 35.977	-.037		+11 22 32.28	-0.50	17.384750
63 03 18.15	8106.65726	8		10 18 09.059	-.052		+11 25 01.43	-0.64	17.403783
63 03 23.14	8111.64311	9		10 17 26.225	-.037		+11 28 57.93	-0.45	17.441033
63 03 24.14	8112.64029	6		10 17 17.982	-.036		+11 29 43.46	-0.16	17.449288
63 03 26.13	8114.63464	8		10 17 01.849	-.039		+11 31 11.37	-0.49	17.466590
63 03 28.12	8116.62900	7		10 16 46.227	-.041		+11 32 36.39	-0.57	17.484906
63 03 29.12	8117.62618	4		10 16 38.614	-.047		+11 33		17.494439
63 03 30.12	8118.62336	9		10 16 31.156	-.040		+11 33 58.25	-0.47	17.504213
63 04 03.11	8122.61211	2		10 16 02.748	-.023		+11 36 31.61	-0.41	17.545685
63 04 06.10	8125.60369	4		10 15 42.963	-.051		+11 38 17.13	-0.59	17.579163
63 04 08.09	8127.59809	7		10 15 30.575	-.050		+11 39 23.03	-0.53	17.602550
63 04 10.09	8129.59249	2		10 15 18.841	-.045		+11 40 24.93	-0.57	17.626760
63 04 11.08	8130.58970	6		10 15 13.238	-.032		+11 40 54.38	-0.61	17.639164
63 04 12.08	8131.58691	4		10 15 07.777	-.048		+11 41 23.15	-0.32	17.651766
63 04 13.08	8132.58411	9		10 15 02.530	-.025		+11 41 50.43	-0.51	17.664556
63 04 15.07	8134.57854	6		10 14 52.510	-.033		+11 42 42.64	-0.15	17.690693
64 01 16.34	8410.84375	4		10 45 58.838	-.052		+ 8 41 56.75	+0.25	17.584295
64 01 17.34	8411.84095	1		10 45 52.749	-.039		+ 8 42 35.01	-0.55	17.572277
64 01 26.31	8420.81566	7		10 44 50.839	-.040		+ 8 49 06.41	-0.79	17.474747
64 01 27.31	8421.81284	4		10 44 43.259	-.035		+ 8 49 53.52	-1.19	17.465149
64 01 29.30	8423.80720	6		10 44 27.680	-.052		+ 8 51 31.87	-0.10	17.446734
64 01 31.30	8425.80155	2		10 44 11.601	-.059		+ 8 53 11.90	-0.18	17.429384
64 02 04.29	8429.79025	2		10 43 38.087	-.024		+ 8 56 39.46	-0.45	17.397943
64 02 05.28	8430.78742	6		10 43 29.421	-.036		+ 8 57 32.95	-0.35	17.390785
64 02 15.25	8440.75906	2		10 41 58.144	-.008		+ 9 06 51.70	-0.43	17.335172
64 02 17.25	8442.75338	6		10 41 38.999	-.048		+ 9 08 47.94	-0.16	17.327642
64 02 23.23	8448.73632	6		10 40 40.658	-.110		+ 9 14 39.65	-0.31	17.312429
64 02 24.23	8449.73348	2		10 40 30.892	-.069		+ 9 15 38.83	-0.08	17.310964
64 02 25.23	8450.73063	8		10 40 21.098	-.037		+ 9 16 37.52	-0.39	17.309812
64 02 27.22	8452.72495	4		10 40 01.383	-.057		+ 9 18 35.58	-0.35	17.308435
64 03 01.21	8455.71641	2		10 39 31.813	-.044		+ 9 21 32.26	-0.34	17.308670
64 03 07.19	8461.69935	2		10 38 33.029	-.017		+ 9 27 21.26	-0.34	17.317428
64 03 12.18	8466.68514	1		10 37 44.889	-.062		+ 9 32 04.87	-0.12	17.333086
64 03 14.17	8468.67947	9		10 37 26.008	-.054		+ 9 33 55.86	+0.10	17.341452
64 03 17.17	8471.67095	4		10 36 58.173	-.048		+ 9 36 38.00	-0.43	17.356213

URANUS

Date	J.E.D. 243	O	L	Obs. R.A. h m s	(O–C) s	L	Obs. Decl. ° ′ ″	(O–C) ″	Distance
64 03 24.15	8478.65112	4		10 35 56.191	-.040		+ 9 42 37.25	-0.73	17.400636
64 03 25.14	8479.64830	1		10 35 47.714	-.046		+ 9 43 26.83	0.00	17.408084
64 03 27.14	8481.64264	8		10 35 31.100	-.034		+ 9 45 02.10	-0.35	17.423768
64 03 28.13	8482.63982	9		10 35 22.970	-.019		+ 9 45 48.54	-0.63	17.432012
64 03 30.13	8484.63417	7		10 35 07.003	-.050		+ 9 47 19.81	-0.48	17.449263
64 04 02.12	8487.62572	3		10 34 44.065	-.030		+ 9 49 30.75	-0.18	17.477022
64 04 05.11	8490.61728	6		10 34 22.324	-.024		+ 9 51 33.91	-0.07	17.506985

NEPTUNE

63 03 15.35	8103.85661	6		14 54 10.161	-.169		-14 44 34.98	+1.12	29.695236
63 04 11.28	8130.78145	6		14 52 05.416	-.176		-14 34 21.47	+1.08	29.408952
63 04 12.27	8131.77865	4		14 51 59.676	-.210		-14 33 54.74	+0.94	29.401842
63 04 13.27	8132.77585	9		14 51 53.933	-.193		-14 33 27.49	+1.15	29.395003
63 04 15.27	8134.77026	6		14 51 42.244	-.202		-14 32 32.85	+1.15	29.382141
63 06 01.13	8181.63856	2		14 46 50.989	-.189		-14 10 57.33	+1.54	29.412994
63 06 07.12	8187.62181	6		14 46 18.426	-.200		-14 08 42.19	+0.59	29.461467
64 03 24.33	8478.83560	8		15 02 18.763	-.207		-15 19 25.40	+0.74	29.595902
64 04 02.31	8487.81056	2		15 01 37.607	-.222		-15 16 10.03	+0.77	29.496777
64 04 05.30	8490.80219	6		15 01 22.352	-.236		-15 14 58.80	+1.27	29.468019
64 04 16.27	8501.77145	6		15 00 21.018	-.172		-15 10 19.99	+1.18	29.382628
64 04 25.24	8510.74624	1		14 59 25.982	-.223		-15 06 16.40	+1.13	29.337716
64 04 26.24	8511.74343	6		14 59 19.678	-.232		-15 05 48.18	+1.74	29.334160
64 05 05.21	8520.71820	9		14 58 22.147	-.206		-15 01 38.74	+1.26	29.315282
64 05 06.21	8521.71539	2		14 58 15.701	-.190		-15 01 10.90	+1.34	29.314650
64 05 08.20	8523.70978	1		14 58 02.720	-.231		-15 00 15.54	+1.29	29.314285
64 05 11.20	8526.70137	2		14 57 43.394	-.162		-14 58 53.62	+0.43	29.315945
64 05 16.18	8531.68734	9		14 57 11.278	-.222		-14 56 37.35	+0.95	29.324619
64 05 17.18	8532.68454	6		14 57 04.928	-.215		-14 56 10.24	+1.36	29.327234
64 05 19.17	8534.67893	1		14 56 52.269	-.226		-14 55 17.60	+1.03	29.333323
64 05 22.17	8537.67052	1		14 56 33.533	-.196		-14 53 58.92	+1.50	29.344591
64 05 23.16	8538.66772	9		14 56 27.324	-.218		-14 53 33.63	+1.10	29.348917
64 05 26.15	8541.65932	4		14 56 09.006	-.223		-14 52 18.46	+0.54	29.363563
64 06 03.13	8549.63694	8		14 55 22.319	-.199		-14 49 07.82	+0.94	29.414589
64 06 04.13	8550.63414	3		14 55 16.704	-.220		-14 48 45.44	+0.83	29.422154
64 06 11.11	8557.61460	8		14 54 39.449	-.231		-14 46 17.07	+1.21	29.482244
64 06 12.11	8558.61181	8		14 54 34.443	-.220		-14 45 57.86	+0.82	29.491805
64 06 17.09	8563.59788	8		14 54 10.564	-.198		-14 44 25.38	+1.18	29.543111
64 06 18.09	8564.59510	8		14 54 06.062	-.171		-14 44 08.20	+1.15	29.554042

CERES

63 03 09.21	8097.71934	9		11 12 18.050	-.360		+23 37 27.08	+0.28	1.594184
63 03 10.21	8098.71600	6		11 11 25.694	-.385		+23 42 11.23	+0.04	1.596030
63 03 11.21	8099.71267	7		11 10 33.546	-.359		+23 46 42.09	+0.19	1.598133
63 03 15.19	8103.69937	6		11 07 07.781	-.351		+24 02 22.78	+0.30	1.609087
63 03 18.18	8106.68946	8		11 04 38.373	-.375		+24 11 32.75	+0.17	1.619921
63 03 19.18	8107.68617	8		11 03 49.909	-.328		+24 14 05.78	+0.39	1.624019
63 03 23.17	8111.67310	9		11 00 43.960	-.347		+24 21 42.83	+0.46	1.642787
63 03 24.16	8112.66986	6		10 59 59.800	-.335		+24 22 58.07	+0.31	1.648061
63 03 26.16	8114.66341	8		10 58 34.614	-.350		+24 24 41.96	+0.28	1.659280
63 03 29.15	8117.65385	4		10 56 35.592	-.326		+24 25 21.90	+0.54	1.677745
63 03 30.15	8118.65069	9		10 55 58.446	-.309		+24 25 04.21	+0.33	1.684320
63 04 03.13	8122.63821	2		10 53 43.253	-.337		+24 21 25.14	-0.05	1.712614
63 04 04.13	8123.63513	7		10 53 13.026	-.296		+24 19		1.720167
63 04 05.13	8124.63207	6		10 52 44.229	-.279		+24 18 09.40	+0.65	1.727902
63 04 06.12	8125.62902	4		10 52 16.868	-.307		+24 16 09.88	+0.29	1.735818

CERES

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
63 04 08.12	8127.62298	7		10 51 26.705	-.306		+24 11 29.90	-0.42	1.752175
63 04 10.11	8129.61701	2		10 50 42.653	-.303		+24 05 57.60	-0.14	1.769204
63 04 11.11	8130.61405	6		10 50 22.965	-.289		+24 02 52.25	+0.25	1.777963
63 04 12.11	8131.61111	4		10 50 04.795	-.312		+23 59 33.82	+0.23	1.786880
63 04 13.10	8132.60819	9		10 49 48.243	-.306		+23 56 03.09	+0.15	1.795951
63 04 15.10	8134.60240	6		10 49 19.848	-.297		+23 48 25.51	+0.48	1.814542
63 04 16.09	8135.59954	4		10 49 08.018	-.304		+23 44 18.34	-0.12	1.824054
63 04 21.08	8140.58548	6		10 48			+23 20 57.13	-0.69	1.873653
64 04 16.41	8501.91517	6		18 27 52.868	+.080		-22 24 26.07	+0.93	2.300391
64 04 25.39	8510.89233	1		18 30 22.899	+.039		-22 46 19.33	+0.37	2.195097
64 04 26.38	8511.88970	6		18 30 32.038	+.061		-22 48 58.74	+0.85	2.183873
64 05 05.36	8520.86525	9		18 30 43.080	+.067		-23 15 11.51	-0.13	2.088156
64 05 06.36	8521.86245	2		18 30 36.260	+.080		-23 18 20.42	+0.53	2.078181
64 05 07.35	8522.85962	4		18 30 27.817	+.100		-23 21 33.25	+0.17	2.068354
64 05 11.34	8526.84812	2		18 29 37.496	+.049		-23 34 50.15	+1.04	2.030607
64 05 16.33	8531.83332	2		18 27 58.215	+.095		-23 52 26.57	+0.75	1.987273
64 05 17.33	8532.83030	6		18 27 33.597	+.122		-23 56 06.13	-0.44	1.979162
64 05 18.32	8533.82727	2		18 27 07.358	+.084		-23 59 45.67	+0.55	1.971246
64 05 22.31	8537.81496	4		18 25 07.319	+.121		-24 14 46.74	+0.81	1.941597
64 05 23.31	8538.81184	2		18 24 33.567	+.096		-24 18 36.81	+0.13	1.934707
64 05 24.30	8539.80871	6		18 23 58.397	+.100		-24 22 27.24	+0.59	1.928032
64 05 26.30	8541.80238	9		18 22 43.832	+.086		-24 30 12.19	+0.89	1.915342
64 05 28.29	8543.79600	9		18 21 23.807	+.060		-24 38 01.80	+0.32	1.903555
64 05 30.28	8545.78956	1		18 19 58.599	+.057		-24 45 53.27	+0.45	1.892697
64 06 04.27	8550.77320	4		18 16 04.576	+.046		-25 05 33.41	+1.47	1.869787
64 06 11.24	8557.74982	1		18 09 55.208	+.072		-25 32 37.31	+0.85	1.848464
64 06 12.24	8558.74645	2		18 08 59.411	+.090		-25 36 23.40	+0.83	1.846486
64 06 14.23	8560.73968	6		18 07 05.972	+.022		-25 43		1.843351
64 06 17.22	8563.72949	9		18 04 12.706	+.109		-25 54 42.10	+0.77	1.840708
64 06 18.22	8564.72608	6		18 03 14.278	+.079		-25 58 14.12	+1.11	1.840379
64 06 26.19	8572.69882	3		17 55 24.965	+.092		-26 24 45.68	+1.12	1.847681
64 06 27.19	8573.69542	2		17 54 26.982	+.111		-26 27 50.47	+0.71	1.849831
64 06 29.18	8575.68864	2		17 52 32.129	+.126		-26 33 47.97	+1.54	1.854946
64 07 01.18	8577.68187	6		17 50 39.138	+.127		-26 39 32.50	+1.21	1.861143

PALLAS

63 03 09.02	8097.52420	9		6 30 31.761	-.375		-12 27 13.37	+0.02	1.598528
63 03 15.01	8103.51164	6		6 36 03.416	-.362		-10 12 04.67	-0.36	1.643373
63 03 16.00	8104.50961	9		6 37 03.985	-.376		- 9 50 01.94	-0.24	1.651251
63 03 23.99	8112.49394	6		6 45 59.228	-.364		- 6 59 42.82	+0.26	1.718169
64 02 23.47	8448.97587	6		16 26 34.613	-.298		+ 7 40		2.558142
64 02 27.46	8452.96739	4		16 30 05.884	-.246		+ 8 29 20.58	-0.05	2.521140
64 03 06.44	8460.94979	4		16 36 12.916	-.293		+10 12 42.16	+0.31	2.449552
64 03 13.43	8467.93362	2		16 40 28.427	-.269		+11 49 24.85	+0.25	2.390417
64 03 16.42	8470.92646	6		16 41 57.749	-.275		+12 32 21.25	+0.61	2.366336
64 03 24.40	8478.90665	8		16 44 53.734	-.296		+14 29 58.44	+0.51	2.306611
64 03 27.39	8481.89894	1		16 45 35.702	-.305		+15 14 50.80	+0.28	2.286102
64 03 31.38	8485.88843	8		16 46 10.751	-.297		+16 14 56.48	+0.22	2.260528
64 04 02.38	8487.88306	2		16 46 19.181	-.313		+16 44 59.34	+0.48	2.248545
64 04 05.37	8490.87488	6		16 46 20.356	-.324		+17 29 53.55	+0.32	2.231630
64 04 16.34	8501.84354	6		16 44 26.734	-.334		+20 09 44.31	+0.35	2.181553
64 04 25.31	8510.81638	1		16 40 42.478	-.353		+22 09 06.15	+0.93	2.156058
64 05 05.28	8520.78482	9		16 34 34.118	-.368		+24 01 57.41	+0.64	2.145433
64 05 06.28	8521.78160	2		16 33 51.485	-.349		+24 11 49.51	+0.82	2.145432
64 05 07.27	8522.77836	4		16 33 07.916	-.351		+24 21 23.70	+0.33	2.145627
64 05 08.27	8523.77512	1		16 32 23.489	-.351		+24 30 41.55	+0.90	2.146020

PALLAS

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
64 05 11.26	8526.76534	2		16 30 05.409	-.366		+24 56 44.91	+1.32	2.148384
64 05 16.24	8531.74888	2		16 26 02.520	-.357		+25 33 46.29	+0.69	2.156286
64 05 17.24	8532.74557	6		16 25 12.450	-.384		+25 40 10.79	+0.59	2.158458
64 05 18.24	8533.74226	2		16 24 22.029	-.397		+25 46 16.41	+1.83	2.160825
64 05 21.23	8536.73230	2		16 21 49.190	-.367		+26 02 25.27	+0.69	2.169093
64 05 22.22	8537.72898	4		16 20 57.836	-.388		+26 07 07.36	+0.93	2.172233
64 05 23.22	8538.72566	2		16 20 06.428	-.347		+26 11 27.54	-0.07	2.175565
64 05 24.22	8539.72233	6		16 19 14.956	-.329		+26 15 28.14	+0.25	2.179086
64 05 26.21	8541.71568	9		16 17 32.011	-.352		+26 22 26.62	+0.63	2.186693
64 05 30.20	8545.70240	1		16 14 07.766	-.339		+26 32 12.91	+1.07	2.204133
64 06 01.19	8547.69578	2		16 12 27.184	-.362		+26 35 01.36	+0.61	2.213948
64 06 04.18	8550.68589	4		16 09 59.386	-.341		+26 36 40.61	-0.11	2.230009
64 06 11.16	8557.66303	8		16 04 35.007	-.333		+26 29 01.14	+0.31	2.273529
64 06 12.15	8558.65980	2		16 03 51.611	-.375		+26 26 38.88	+0.08	2.280411
64 06 17.14	8563.64380	8		16 00 28.529	-.350		+26 10 21.23	+0.37	2.317168
64 06 26.11	8572.61577	3		15 55 28.964	-.342		+25 24 04.16	+0.09	2.392439
64 06 30.10	8576.60366	8		15 53 46.134	-.341		+24 57 25.05	+0.15	2.429300
64 07 01.10	8577.60067	4		15 53 23.497	-.343		+24 50 14.61	+0.33	2.438817

JUNO

63 03 09.22	8097.72452	9		11 19 47.045	-.178		+ 3 45 24.09	+0.46	1.760377
63 03 10.22	8098.72123	6		11 18 58.518	-.188		+ 3 55 14.33	-0.12	1.762514
63 03 15.20	8103.70481	6		11 14 58.685	-.161		+ 4 43 57.80	+0.60	1.777601
63 03 18.19	8106.69500	8		11 12 38.933	-.188		+ 5 12 27.81	-0.13	1.790154
63 03 23.17	8111.67879	9		11 08 57.580	-.164		+ 5 58 08.82	+0.48	1.816803
63 03 24.17	8112.67558	6		11 08 15.451	-.192		+ 6 06 56.05	+0.04	1.822976
63 03 26.16	8114.66917	8		11 06 53.833	-.156		+ 6 24 08.37	+0.36	1.836145
63 03 29.15	8117.65965	4		11 04 58.417	-.151		+ 6 48 52.59	+0.51	1.857909
63 04 03.14	8122.64402	2		11 02 07.283	-.171		+ 7 26 56.39	+0.32	1.899293
63 04 08.12	8127.62874	7		10 59 45.622	-.148		+ 8 00 42.17	+0.57	1.946625
63 04 10.12	8129.62272	2		10 58 57.746	-.127		+ 8 12 55.12	-0.35	1.967108
63 04 11.11	8130.61974	6		10 58 35.671	-.206		+ 8 18 45.48	-0.09	1.977666
63 04 12.11	8131.61677	4		10 58 15.036	-.149		+ 8 24 24.79	+0.16	1.988429
63 04 13.11	8132.61382	9		10 57 55.683	-.131		+ 8 29 52.88	+0.55	1.999393
63 04 15.10	8134.60795	6		10 57 20.852	-.214		+ 8 40 14.14	+0.45	2.021907
63 04 16.10	8135.60505	4		10 57 05.552	-.142		+ 8 45 07.67	+0.27	2.033450
63 04 21.09	8140.59074	6		10 56 09.004	-.078		+ 9 06 47.11	+1.10	2.093851

VESTA

63 03 09.25	8097.75362	9		12 01 48.851	+.148		+12 24 32.51	-1.68	1.331678
63 03 15.23	8103.73358	6		11 56 32.074	+.157		+13 12 30.23	-1.50	1.319842
63 03 18.22	8106.72349	8		11 53 47.178	+.122		+13 34 52.39	-1.44	1.317444
63 03 23.20	8111.70664	9		11 49 10.085	+.121		+14 08 51.87	-0.99	1.318643
63 03 24.20	8112.70327	6		11 48 15.062	+.144		+14 15 05.05	-1.18	1.319655
63 03 26.19	8114.69655	8		11 46 26.010	+.127		+14 26 53.57	-1.05	1.322439
63 03 28.18	8116.68986	7		11 44 38.944	+.131		+14 37 48.14	-0.89	1.326222
63 03 29.18	8117.68652	4		11 43 46.296	+.088		+14 42 54.38	-0.69	1.328481
63 03 30.18	8118.68319	9		11 42 54.489	+.156		+14 47 45.21	-1.25	1.330983
63 04 03.16	8122.66997	2		11 39 35.625	+.137		+15 04 40.66	-1.33	1.343333
63 04 04.16	8123.66670	7		11 38 48.420	+.162		+15 08		1.346990
63 04 05.16	8124.66343	6		11 38 02.293	+.146		+15 11 35.91	-1.04	1.350869
63 04 06.16	8125.66018	4		11 37 17.362	+.165		+15 14 39.31	-1.45	1.354965
63 04 08.15	8127.65373	7		11 35 51.151	+.154		+15 19 59.67	-1.13	1.363793
63 04 10.14	8129.64733	2		11 34 30.227	+.158		+15 24 15.13	-1.70	1.373448

VESTA

Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)	Distance
	243			h m s	s		° ′ ″	″	
63 04 11.14	8130.64416	6		11 33 51.817	+.108		+15 25 59.84	-1.01	1.378576
63 04 12.14	8131.64100	4		11 33 14.898	+.122		+15 27 27.42	-1.45	1.383900
63 04 13.13	8132.63786	9		11 32 39.472	+.134		+15 28 39.84	-1.08	1.389415
63 04 15.13	8134.63164	6		11 31 33.182	+.126		+15 30 16.33	-1.21	1.401008
63 04 16.12	8135.62855	4		11 31 02.410	+.141		+15 30 40.86	-1.44	1.407078
63 04 18.12	8137.62244	7		11 30 05.685	+.128		+15 30 43.92	-0.95	1.419744
63 04 19.11	8138.61941	2		11 29 39.834	+.154		+15 30 21.77	-1.21	1.426333
63 04 21.11	8140.61341	6		11 28 53.133	+.114		+15 28 52.04	-1.57	1.440007
63 04 22.11	8141.61044	2		11 28 32.385	+.118		+15 27 45.11	-1.30	1.447082

MOON

Lun.	Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)
		243			h m s	s		° ′ ″	″
497	63 03 08.16	8096.65932	3	1	9 41 43.398	1.187	N	+15 59 45.26	-5.08
	63 03 09.19	8097.69177	9	1	10 32 30.997	1.093	N	+12 26 56.28	-6.29
	63 03 10.22	8098.72270	6	2	11 21 06.872	1.118	N	+ 8 23 22.31	-6.75
	63 03 11.25	8099.75247	7	2	12 08 02.413	1.026		+ 4 01	
	63 03 14.34	8102.83949	7	2	14 25 31.643	0.956	S	- 9 07 24.08	-5.04
	63 03 15.37	8103.86937	6	2	15 12 36.894	1.108	S	-12 59 19.17	-5.45
	63 03 16.40	8104.90044	9	2	16 01 25.146	1.107	S	-16 19 58.96	-3.65
	63 03 18.47	8106.96735	8	2	17 45 55.041	1.265		-20 46	
498	63 04 03.04	8122.53999	2	1	8 31 55.188	1.268		+19 40	
	63 04 04.07	8123.57456	7	1	9 25 46.802	1.204		+17 06	
	63 04 05.11	8124.60723	6	1	10 16 53.784	1.147	N	+13 44 42.28	-4.77
	63 04 06.14	8125.63826	4	1	11 05 38.846	1.126	N	+ 9 49 09.94	-6.91
	63 04 08.20	8127.69708	7	1	12 38 27.841	1.020	N	+ 1 02 12.46	-6.76
	63 04 10.25	8129.75477	2	2	14 09 38.572	1.008	S	- 7 49 42.07	-6.69
	63 04 11.28	8130.78436	6	2	14 56 18.471	1.088	S	-11 52 48.23	-5.29
	63 04 12.32	8131.81498	4	2	15 44 27.929	1.093	S	-15 27 27.40	-4.61
	63 04 13.35	8132.84693	9	2	16 34 32.454	1.171	S	-18 23 23.18	-3.68
	63 04 15.42	8134.91520	6	2	18 21 00.855	1.306	N	-21 38 11.00	-0.34
500	63 06 01.03	8181.52902	2	1	12 08 41.020	1.018		+ 4 18	
	63 06 05.15	8185.64525	8	1	15 12 16.904	1.105	N	-13 09 38.75	-5.69
	63 06 07.21	8187.70928	6	1	16 52 37.726	1.174	N	-19 25 25.07	-3.48
	63 06 12.39	8192.88830	7	2	21 30 50.629	1.236	N	-17 22 40.41	+4.57
501	63 07 02.06	8212.55928	8	1	14 54 36.188	1.076	N	-11 38 34.54	-6.05
	63 07 05.16	8215.65608	1	1	17 26 12.546	1.215	N	-20 42 14.19	-3.69
	63 07 06.19	8216.69162	8	1	18 21 27.996	1.232	N	-21 56 33.38	-1.08
	63 07 08.27	8218.76543	2	2	20 15 56.033	1.346	N	-20 49 17.52	+2.28
	63 07 12.41	8222.90847	1	2	23 58 14.748	1.201	N	- 5 29 35.06	+6.32
502	63 08 02.10	8243.60186	1	1	17 58 18.382	1.227	N	-21 34 13.29	-1.77
	63 08 03.14	8244.63822	4	1	18 54 45.745	1.321	S	-22 07 55.85	-0.97
	63 08 05.21	8246.71321	7	1	20 50 55.010	1.324	S	-19 28 43.59	+3.51
	63 08 06.25	8247.75044	1	2	21 48 37.184	1.219	N	-16 18 09.94	+5.12
	63 08 08.32	8249.82251	1	2	23 40 34.462	1.229	N	- 7 09 03.21	+6.89
	63 08 09.36	8250.85759	4	2	0 35 10.459	1.287	N	- 1 44 49.56	+8.13
	63 08 11.43	8252.92818	2	2	2 24 58.457	1.252	N	+ 9 05 56.48	+6.48
503	63 08 31.08	8272.58359	3	1	19 26 15.802	1.350	S	-21 59 54.36	+1.45
	63 09 02.16	8274.65866	8	1	21 22 32.591	1.304	S	-17 54 21.03	+4.31
	63 09 07.34	8279.84126	9	2	2 05 55.019	1.288	N	+ 7 28 58.04	+6.85
	63 09 08.38	8280.87834	6	2	3 03 24.627	1.341	N	+12 36 30.05	+6.52
	63 09 09.42	8281.91647	4	2	4 02 24.829	1.409		+16 54	
504	63 09 25.96	8298.45695	8	1	18 05 54.311	1.244		-22 03	
	63 09 26.99	8299.49236	4	1	19 00 59.119	1.278		-22 25	
	63 09 28.03	8300.52874	2	1	19 57 27.265	1.254		-21 35	
	63 10 01.14	8303.63935	1	1	22 49 00.130	1.299		-11 49	
	63 10 02.18	8304.67595	4	1	23 45 47.773	1.358		- 6 34	
	63 10 03.21	8305.71261	1	2	0 42 40.324	1.252		- 0 48	
	63 10 04.25	8306.74972	2	2	1 40 11.947	1.299	N	+ 5 05 48.37	+7.22
	63 10 05.29	8307.78770	4	2	2 38 58.493	1.423	N	+10 42 10.79	+6.44
	63 10 06.33	8308.82681	6	2	3 39 23.501	1.431	N	+15 34 33.36	+6.03
	63 10 07.37	8309.86702	2	2	4 41 23.686	1.430	N	+19 19 59.41	+4.35
	63 10 08.41	8310.90787	9	2	5 44 19.139	1.454		+21 41	
	63 10 09.45	8311.94852	1	2	6 46 58.207	1.435	S	+22 33 05.74	+2.53
505	63 10 24.94	8327.43929	8	1	19 34 44.758	1.319	S	-22 20 41.65	+1.19
	63 10 27.01	8329.51086	6	1	21 25 57.879	1.256	S	-18 05 42.40	+4.50
	63 10 28.05	8330.54659	2	1	22 21 30.152	1.342	S	-14 16 26.03	+6.56
	63 10 29.08	8331.58226	4	1	23 16 57.220	1.255	S	- 9 29 52.28	+7.38
	63 10 31.15	8333.65468	3	1	1 09 24.781	1.316	S	+ 1 55 12.50	+8.05
	63 11 03.27	8336.77266	6		4 11		N	+17 51 49.07	+5.61
	63 11 04.32	8337.81494	2	2	5 16 35.232	1.514	N	+21 03 08.61	+3.33

MOON

Lun.	Date	J.E.D.	O	L	Obs. R.A.	(O–C)	L	Obs. Decl.	(O–C)
		243			h m s	s		° ′ ″	″
506	63 11 24.99	8358.49222	1	1	22 53 23.215	1.188	S	-11 51 20.88	+7.10
	63 11 26.03	8359.52654	4	1	23 46 53.398	1.257	S	- 6 48 31.00	+7.72
	63 11 28.10	8361.59717	2	1	1 36 45.683	1.270	S	+ 4 38 13.57	+7.06
	63 12 02.26	8365.76017	4		5 47		S	+22 07 33.14	+1.90
	63 12 04.35	8367.84627	2	2	8 00 06.399	1.456	S	+22 04 03.58	-4.00
	63 12 06.42	8369.92260	2	2	9 58 12.641	1.205	S	+16 18 24.06	-6.01
	63 12 07.46	8370.95634	9	2	10 50 51.459	1.151	S	+12 08 38.85	-7.45
	63 12 08.49	8371.98774	6	2	11 40 08.769	1.103	S	+ 7 32 39.36	-7.07
507	63 12 22.94	8386.43984	6	1	23 28 09.301	1.241	S	- 8 46 30.70	+6.86
	63 12 27.07	8390.57940	8	1	3 05 26.552	1.329	S	+12 59 20.89	+5.54
	63 12 28.11	8391.61904	2		4 06		S	+17 33 14.80	+4.97
	63 12 29.16	8392.66110	4	1	5 11 18.499	1.474	S	+20 55 44.90	+3.78
	63 12 31.24	8394.74852	7	2	7 25 24.970	1.588	S	+22 46 42.90	-2.07
	64 01 05.43	8399.93101	6	2	12 08 38.236	1.134	S	+ 4 43 44.48	-6.73
	64 01 06.46	8400.96079	2	2	12 55 34.474	1.030	S	- 0 12 19.32	-7.40
508	64 01 21.95	8416.45549	1	1	1 49 01.838	1.244	S	+ 5 50 02.66	+8.19
	64 01 22.99	8417.49067	3	1	2 43 46.887	1.325	S	+11 07 42.21	+6.58
	64 01 26.10	8420.60890	7	1	5 46 19.644	1.453	S	+22 06 24.96	+1.66
	64 01 27.15	8421.65164	4	1	6 51 58.971	1.525	N	+22 58 53.65	-0.59
	64 01 31.30	8425.80847	2	2	10 54 12.257	1.258	S	+11 51 33.02	-7.62
	64 02 03.40	8428.90249	7	2	13 21 47.472	1.103	S	- 3 04 21.73	-6.87
	64 02 04.43	8429.93198	2	2	14 08 18.196	0.999	S	- 7 49 56.05	-8.48
	64 02 05.46	8430.96163	6	2	14 55 04.107	1.090	S	-12 11 53.84	-5.76
509	64 02 20.97	8446.47966	3	1	4 22 13.169	1.408	S	+18 42 05.83	+4.47
	64 02 22.01	8447.51954	9	1	5 23 44.605	1.448	S	+21 33 34.80	+1.62
	64 02 23.06	8448.56069	6	1	6 27 06.488	1.521	N	+22 57 58.38	+0.48
	64 02 24.10	8449.60209	2	1	7 30 49.318	1.437	N	+22 47 12.97	-2.28
	64 02 25.14	8450.64252	4	1	8 33 08.993	1.466	N	+21 04 00.66	-4.06
	64 02 26.18	8451.68105	7	1	9 32 43.121	1.329	N	+18 01 04.36	-5.78
	64 02 27.21	8452.71723	4	1	10 28 54.374	1.228	N	+13 57 27.32	-6.07
	64 03 01.31	8455.81389	2	2	13 00 18.377	1.149	S	- 0 58 12.96	-7.28
	64 03 02.34	8456.84391	6	2	13 47 35.512	1.103	S	- 5 56 49.40	-7.24
	64 03 06.46	8460.96766	4	2	17 02 02.707	1.172	S	-20 50 26.87	-3.97
510	64 03 24.09	8478.59326	4	1	9 12 24.696	1.371	N	+19 21 14.48	-5.72
	64 03 25.12	8479.62939	1	1	10 08 31.380	1.292	N	+15 39 07.31	-7.21
	64 03 27.19	8481.69551	8	1	11 51 52.668	1.148	N	+ 6 13 43.59	-7.78
	64 03 29.25	8483.75648	6	2	13 27 48.088	1.131	S	- 4 01 15.04	-7.79
	64 03 31.31	8485.81666	8	2	15 02 34.767	1.128	S	-13 17 07.85	-5.95
	64 04 02.37	8487.87957	2	2	16 41 18.388	1.175	S	-20 07 37.86	-4.56
	64 04 04.44	8489.94669	9	2	18 26 06.568	1.225	N	-23 20 16.21	-0.18
511	64 04 23.11	8508.61063	3	1	11 35 45.252	1.102	N	+ 8 00 09.03	-8.05
	64 04 25.17	8510.67115	9	1	13 11 01.935	1.095	N	- 2 12 14.36	-8.11
	64 04 26.20	8511.70075	6	1	13 57 43.238	1.124	N	- 7 10 23.47	-6.84
	64 04 27.23	8512.73064	7	2	14 44 49.114	1.093	N	-11 47 35.05	-5.93
512	64 05 20.02	8535.52665	6	1	11 20 56.846	1.145	N	+ 9 39 49.73	-6.00
	64 05 21.05	8536.55764	3	1	12 09 38.284	1.082	N	+ 4 37 26.76	-8.48
	64 05 22.08	8537.58744	1	1	12 56 37.094	1.139	N	- 0 30 32.15	-8.18
	64 05 23.11	8538.61676	9	1	13 42 53.367	1.093	N	- 5 32 21.55	-7.50
	64 05 24.14	8539.64621	6	1	14 29 20.976	1.056	N	-10 17 15.83	-6.84
	64 05 26.20	8541.70740	9	1	16 05 35.856	1.133	N	-18 14 14.84	-4.62
	64 05 27.24	8542.73969	6	2	16 56 10.185	1.173	S	-21 05 23.99	-4.05
	64 05 28.27	8543.77311	9	2	17 48 22.052	1.241	S	-22 58 41.73	-1.53
	64 05 30.34	8545.84193	1	2	19 35 37.792	1.262	N	-23 25 40.59	+1.22
513	64 06 20.06	8566.56223	3	1	14 14 33.081	1.078	N	- 8 45 39.60	-6.54
	64 06 22.12	8568.62259	1	1	15 49 35.355	1.091	N	-17 06 04.52	-5.50
	64 06 23.15	8569.65440	9	1	16 39 27.883	1.138	N	-20 14 23.46	-3.64
	64 06 26.25	8572.75624	3	2	19 18 20.934	1.255		-23 40	
	64 06 27.29	8573.79092	2	2	20 12 21.567	1.372	N	-22 32 16.44	+2.61
	64 06 28.32	8574.82507	6	2	21 05 36.665	1.271	N	-20 15 59.05	+5.19
	64 06 29.35	8575.85840	2	2	21 57 40.870	1.175	N	-16 58 40.96	+4.56
	64 06 30.39	8576.89091	1	2	22 48 34.413	1.191	N	-12 49 23.18	+5.61